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(54) Height safety lock for overhead doors, gates and the like

(57) A lock (1) for overhead or swinging doors, gates and the like, comprises a box-like construction (2), supporting a rotatable handle (3) and at least a sliding bolt (4,6), projecting from the box-like construction (2).

The lock (1) comprises means (8) for connecting the lock handle (3) to the lock bolt (4,6), as well as means (14) for switching off the mentioned connecting means (8), which can be controllably driven, for causing the bolt (4,6) to slide as the handle (3) is turned, during the opening or closing operation of the lock (1), and for an idle rotation of the handle (3), upon switching off the connection means (8).

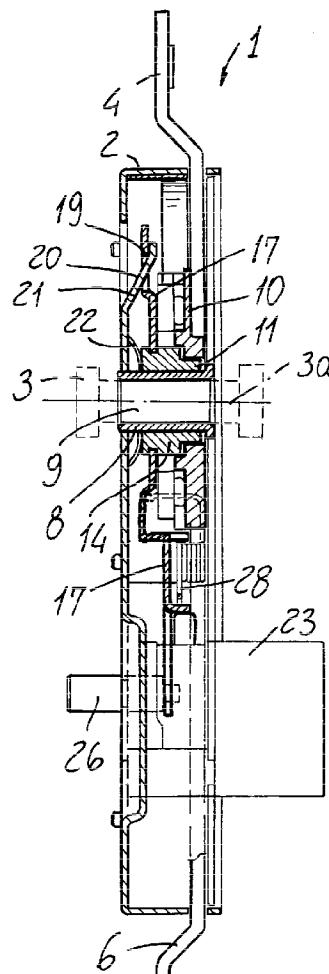


FIG. 5

Description**BACKGROUND OF THE INVENTION**

The present invention relates to a high safety lock for overhead doors, gates and the like.

Prior locks for overhead or swinging doors, gates or the like, are made in several different types depending on the application type and/or on the type of gate or door to be provided with said locks.

Thus, it is possible to generally classify these prior locks into two classes: locks provided with automatic means for automatically recovering the lock bolts to the closed lock position, and locks provided with manual driving means for performing the two opening and closing operations of the locks.

Both the above mentioned lock types are provided with driving means, usually controlled from outside by a lock key and with a manually operated pin in the inside of the lock, which pin will enable or prevent the operation of the handle by means of which the lock is opened or closed.

In these prior locks, the lock handle is latched, in the closure condition of the lock, so that said handle can not turn, being engaged by a tooth element or by a mechanical gear assembly thereon the handle, on the contrary, operates, as it is disengaged, by means of the key or of the pawl element, which can be accessed from the inside side of the door.

Since the handle is constantly engaged, even in the closure condition, with the mechanical system connecting the handle to the lock bolt, it is possible to attempt a tampering of the latter by applying a comparatively great force on the handle, so as to compel the latter to turn: this operation, anyhow, will damage the lock assembly, and can cause the door to be opened in a comparatively easy manner.

SUMMARY OF THE INVENTION

Accordingly, the aim of the present invention is to overcome the above mentioned problem, by providing a high safety lock, which can not be tampered even if, with the lock in its closing condition, the handle is subjected to a comparatively effort.

Within the scope of the above mentioned aim, a main object of the present invention is to provide such a lock which, while having a very simple construction, is very safe in operation and can be provided either with a single or with a plurality of lock bolts, depending on requirements, and which can be made at a very competitive cost, much smaller than that of prior commercially available locks.

According to one aspect of the present invention, the above mentioned aim and objects, as well as yet other objects, which will become more apparent hereinafter, are achieved by a high safety lock for overhead doors, gates and the like, comprising a box-like con-

struction supporting a rotatable handle and at least a sliding bolt, projecting from said box-like construction, characterized in that said lock comprises means for connecting the handle to the bolt, as well as means for

switching off said connecting means, which can be controllably driven in order to cause said bolt to slide as the handle is turned, during the opening or closing operation of the lock, and in order to cause the handle to idly turn, upon closing of the lock.

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BRIEF DESCRIPTION OF THE DRAWINGS

Further characteristics and advantages of the lock according to the present invention will become more apparent from the following detailed disclosure of a preferred embodiment thereof which is illustrated, by way of a merely indicative, but not limitative example, in the figures of the accompanying drawing, where:

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Figure 1 is a front view of the lock, showing only some component elements thereof;

Figure 2 is another front view of the subject lock, in its opening position, with the bolts thereof in a not engaged condition;

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Figure 3 is a further front view of the subject lock, in its closing position, with the bolts thereof being engaged;

Figure 4 is a cross-sectional view, substantially taken along the section line IV-IV of Figure 3; and

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Figure 5 is a further cross-sectional view of the lock, substantially taken along the section line V-V of Figure 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

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With reference to the number references of the above mentioned figures, the lock according to the present invention, which has been generally indicated by the reference number 1, comprises a box-like construction 2, rotatably supporting, about an axis 3a, a driving handle 3 and at least a lock bolt 4, projecting from the box-like construction 2.

In the shown embodiment, are provided four bolts, indicated by the reference numbers 4, 5, 6 and 7, which project from suitable slots, formed through the sidewalls of the box-like construction 2.

Between the handle 3 and the bolts are arranged connecting means, and are moreover provided means for switching off or deactuating said connecting means.

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More specifically, the switching off means can be controllably driven so as to cause the lock bolt or bolts to slide, as the handle 3 is turned, during the opening or closing operation of the lock, and so as to cause the handle 3 to idly turn, upon closing the lock, so as to prevent any tampering attempts to operate the lock bolts by forcing the handle 3.

More particularly, the means connecting the handle 3 to the mentioned bolts comprise a nose element 8,

supported by the box-like construction 2, so as to rotate about its axis, which substantially coincides with the axis 3a of the handle 3.

The nose element 8 is centrally traversed by a polygonal cross-section hole 9, provided for receiving the square-cross-section shaft connecting the portion of the handle arranged outside the door with portion thereof arranged inside the door.

The connecting means comprise moreover a cam disc 10, which is provided with a central hole 11 therethrough said nose element 8 is caused to pass.

More specifically the cam disc 10 is peripherally provided with a plurality of hollows 12, therewithin are engaged pins 13, rigid with said bolts 4, 5, 6 and 7, so that a rotation of the cam disc 10 will cause the bolts to slide inwardly or outwardly of the box-like construction 2.

As shown, the connecting means comprise furthermore a clutch-in device, which is arranged between the nose element 8 and the cam disc 10, and which can be operated both for coupling, during the rotary movement, the nose or noix element 8 to the cam disc 10, and for disengaging, in the rotary movement, these two elements.

The clutch-in device comprises a sleeve 14 which coaxially extends about the nose element 8 and is rigid with the latter in the rotary movement about the axis 3a, being able of sliding in a direction parallel to the mentioned axis 3a.

The sleeve 14 is provided, at the end portion thereof facing the cam disc 10, with teeth 15 which can be engaged or disengaged by causing said sleeve 14 to axially translate with respect to seats or recesses 16 as provided on the cam disc 10.

The switching-off or disengaging means comprise a slide 17 which is slidably supported, along a cross direction of the axis 3a, by the mentioned box-like construction 2.

The slide 17 engages in slots 18, provided on the outer shell of the sleeve 14, and engages, by a portion 19 thereof, with a slanted surface or plane 20, constituted by a tab 21 of the mentioned box-like construction 2, said tab being inwardly bent.

Thus, a displacement of the slide 17 transversely of the axis 3a, will cause, because of the coupling with the slanted plane 20, a displacement of the slide 17 in a direction parallel to the axis 3a, so as to disengage the teeth 15 from the seats 16.

This displacement is counter-biassed by a blade spring 22, arranged between the box-like construction 2 and the sleeve 14, and operating on the sleeve 14 so as to cause the teeth 15 to engage with the recesses 16.

The displacement of the slide 17 transversely of the axis 3a is obtained by a key device 23, including a cam element 24 which can turn under the action of the key of the device 23, operating against a shoulder 25 of the slide 17.

In particular, the slide 17 can also be driven or displaced by manually driving a pawl 26, which is affixed

to the slide 17 and which projects, through a suitable hole 27, from the side of the box-like construction 2 which will face the inside of the room closed by the door.

The displacement of the slide 17 in that direction which would cause the clutch-in device to be disengaged, is resiliently counter-biassed by a spring 28.

The lock according to the present invention is moreover provided with a further spring 29 which has an end portion thereof affixed inside the box-like construction 2 and which operates, by the other end portion thereof, on the cam disc 10 so as to provide a snap type of effect, as the cam disc 10 is brought to the position thereof actuating the closure of the lock.

Moreover, the hollows 12 are laterally provided with a recess 30, which will cause the bolts 4, 5, 6 and 7 to be locked in their closing position, so as to allow said bolts to be moved in an opposite direction exclusively by rotating the cam disc 10.

The lock hereinabove disclosed operates as follows.

In its closing position, which is in particular shown in Figures 3 and 4, the clutch-in device is deactuated.

Thus, the nose or noix element 8 and, accordingly, the door handle 3, can turn in an idle manner, without affecting the cam disc 10.

Thus, possible tampering attempts on the handle 3, tending to turn the cam disc 10, will be devoid of any effects.

In order to open the lock, it is necessary to displace, upwardly in the figures, the slide 17, by rotating the key inside the key device 23 or by manually operating the pawl 26.

This displacement, because of the coupling with the slanted plane 20 and because of the resilient biassing of the spring 22, will cause the slide 17 to be displaced in a direction substantially parallel to the axis 3a and, accordingly, the sleeve 14 will be caused to engage, by the teeth 15 thereof, in the recesses 16 of the cam disc 10, so as to render the cam disc 10 relatively rigid, about the axis 3a, with the nose element 8 and, accordingly, with the handle 3.

Under this condition, a rotary displacement of the handle 3, either inside or outside, will cause the cam disc 10 to turn and accordingly the bolts to be displaced in the direction of the box like construction 2, with a consequent opening of the door.

Thus, in this condition, the door will be enabled for the movement of the bolts, by operating the handle 3.

In order to switch-off or disengage this function, i.e. for making the handle and bolts independent from one another, it will be sufficient to operate on the pin or pawl 26 or on the key 23, in order to cause the slide 17 to be displaced so as to disengage the bolts from the handle 3.

This disabling operation of the lock can be indifferently performed either with the bolts in their engaged condition or with the bolts in their disengaged condition.

In this connection, it should be pointed out that, as

the key is operated, the enabling or disenabling conditions will be stable conditions.

As, on the contrary, the pawl 26 is operated, under the action of the spring 28, exclusively the disabling condition will be a stable condition.

From the above disclosure and the observation of the figures of the accompanying drawings, it should be apparent that the invention fully achieves the intended aim and objects.

In particular, the fact is to be pointed out that a lock has been provided in which, as the lock is in its disabled condition, the driving handle can freely turn without exerting any effects on the lock bolt.

Thus, any tampering attempts will be prevented to force the lock to an opened condition by forcibly turn the handle.

The invention, as disclosed, is susceptible to several variations and modifications, all of which will come within the scope of the inventive idea.

Moreover, all the constructional details can be replaced by other technically equivalent element.

In practicing the invention, the used materials, as well as the contingent size and shapes, can be any, depending on requirements.

Claims

1. A high safety lock for overhead doors, gates and the like, comprising a box-like construction supporting a rotatable handle and at least a sliding bolt, projecting from said box-like construction, characterized in that said lock comprises means for connecting the handle to the bolt, as well as means for switching off said connecting means, which can be controllably driven in order to cause said bolt to slide as the handle is turned, during the opening or closing operation of the lock, and in order to cause the handle to idly turn, upon closing of the lock.
2. A lock according to Claim 1, characterized in that said connecting means comprise a nose element, which is rotatably supported about a rotary axis thereof by said box-like construction and is axially traversed by a polygonal hole, provided for receiving the shaft of the handle and a cam disc, rotatably supported about a rotary axis thereof by said box-like construction and operating on at least a bolt, between said nose element and cam disc, a clutch-in device being furthermore provided for coupling rotatively said nose element and cam disc, the switching-off means controllably operating on said clutch-in device.
3. A lock according to one or more of the preceding claims, characterized in that said clutch-in device comprises a sleeve, mounted about said nose element and rotatively rigid therewith about the axis

thereof, said sleeve being axially slidable along said nose element and being provided, at one axial end portion thereof, facing said cam disc, with engageable or disengageable teeth, under an axial displacement of said sleeve, with/from recesses provided on said cam disc mounted about said nose element.

4. A lock according to one or more of the preceding claims, characterized in that said switching off means comprise a slide, which can be displaced in a direction substantially parallel to the axis of the nose element and engaging with the sleeve of the clutch-in device, for disengaging it from said cam disc, as counter-biased by return elastic means.
5. A lock according to one or more of the preceding claims, characterized in that said slide is movable transversely of the axis of said nose element, a slanted plane portion being moreover provided on one of the inner sidewalls of said box-like construction, engaging with said slide, as it is transversely displaced of the axis of said nose element, in order to drive said sleeve also in a direction substantially parallel to the axis of said nose element, in order to switch-on or switch-off said clutch-in device.
6. A lock according to one or more of the preceding claims, characterized in that said lock comprises moreover a key device for driving the slide in that direction which will actuate or switch-on said clutch-in device, against the counter-biassing of said resilient return means.
7. A lock according to one or more of the preceding claims, characterized in that said slide is provided, on a side of said box-like body provided for facing the inside of a room closed by said door, with a pawl for operating said slide in a direction actuating said clutch-in device.
8. A lock according to one or more of the preceding claims, characterized in that said cam disc is provided with the plurality of hollows for housing therein pin elements rigid with said bolts.
9. A lock according to one or more of the preceding claims, characterized in that said hollows are laterally provided with a recess for locking said bolts in a closing condition thereof.

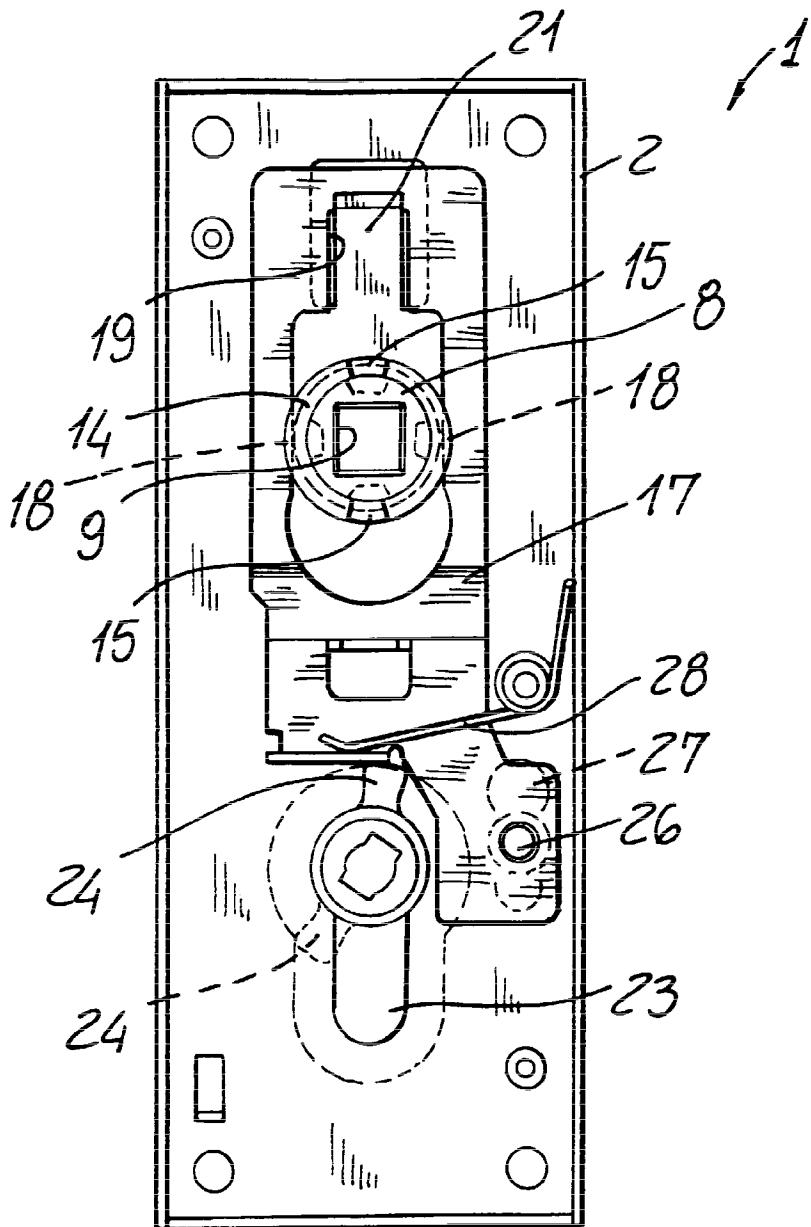
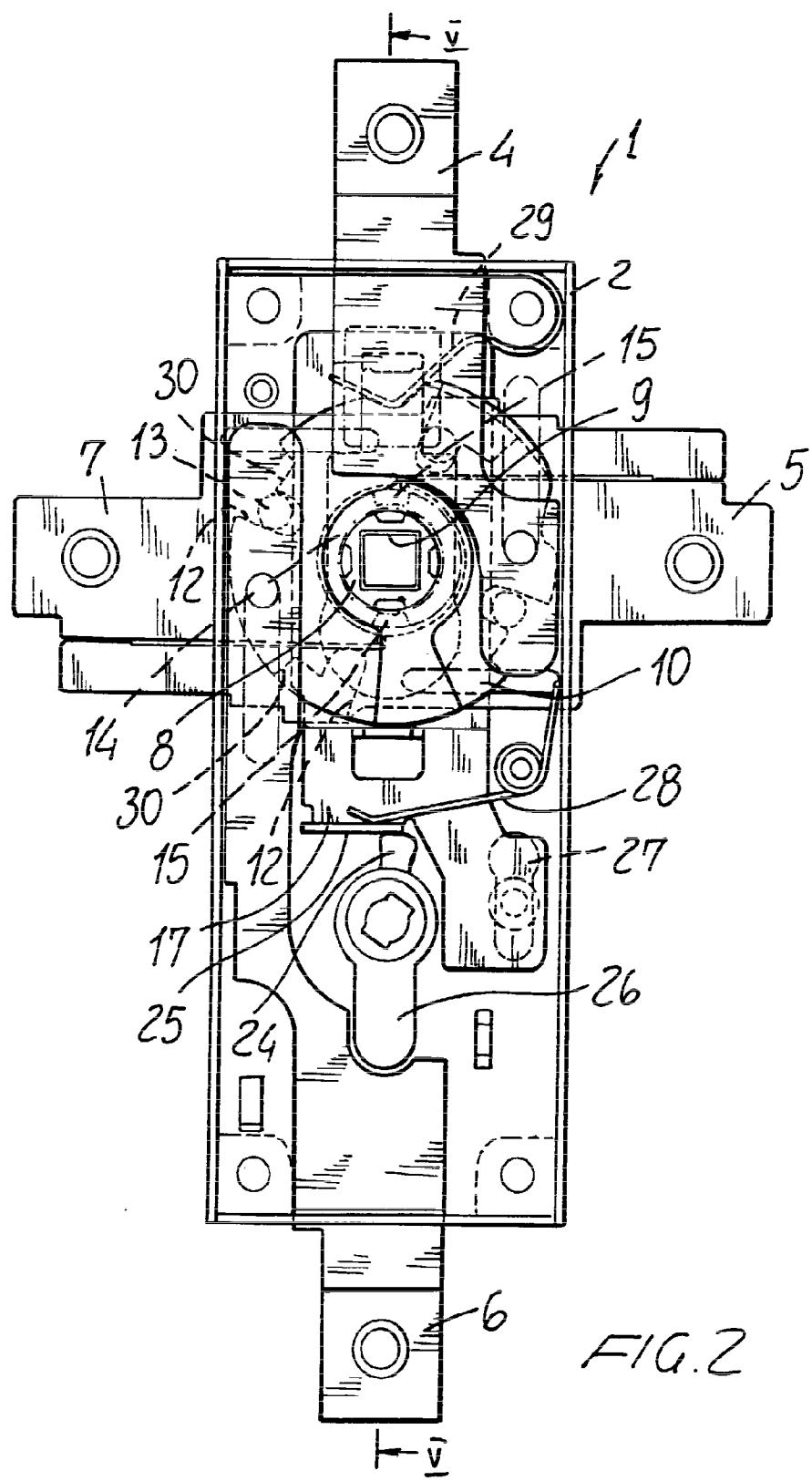
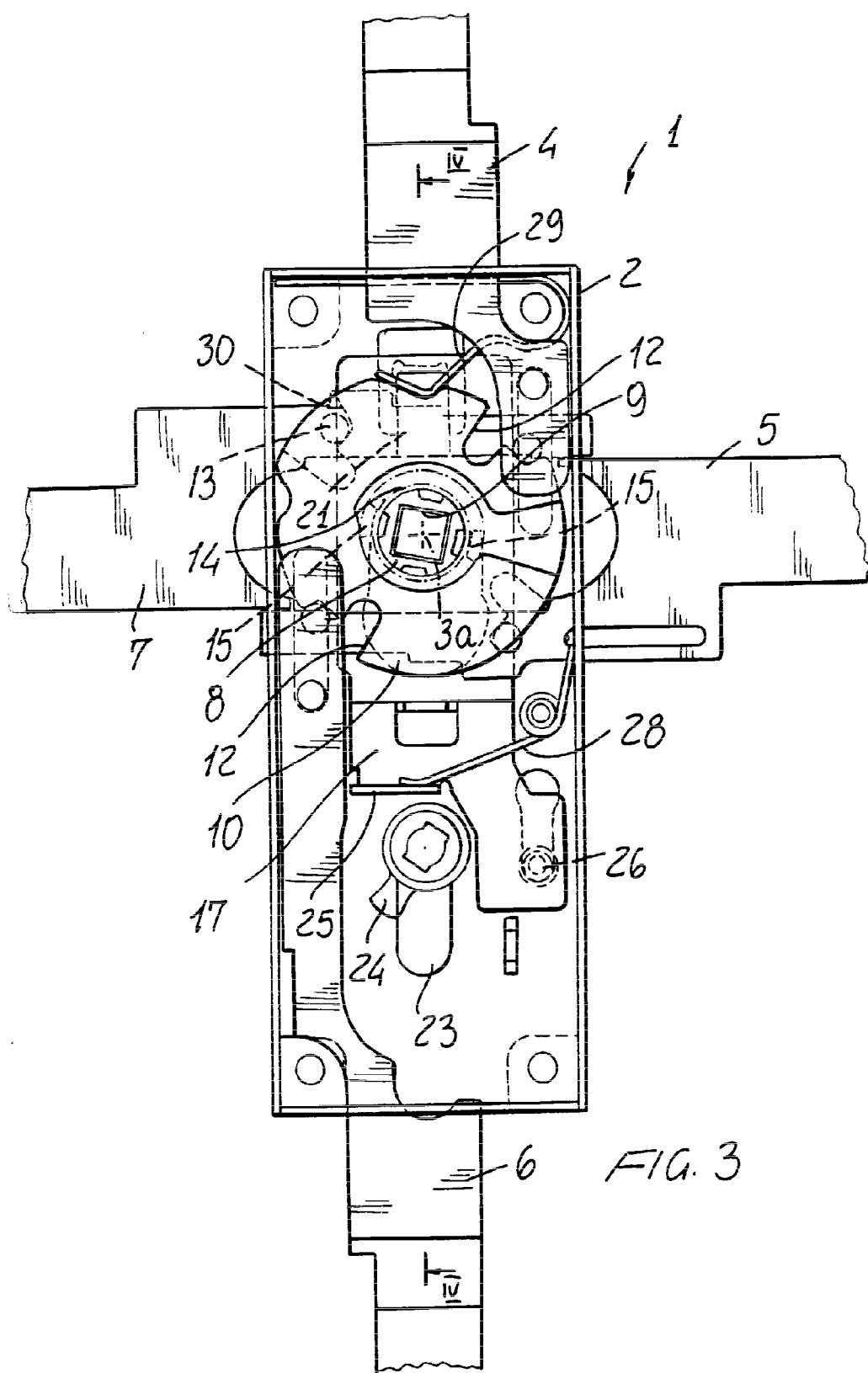
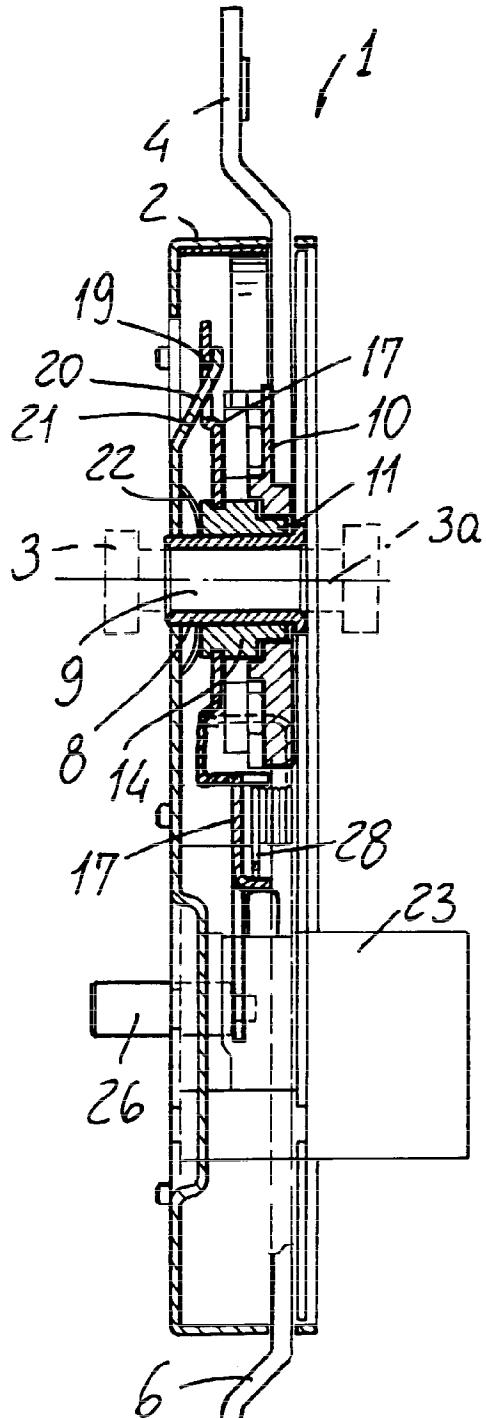
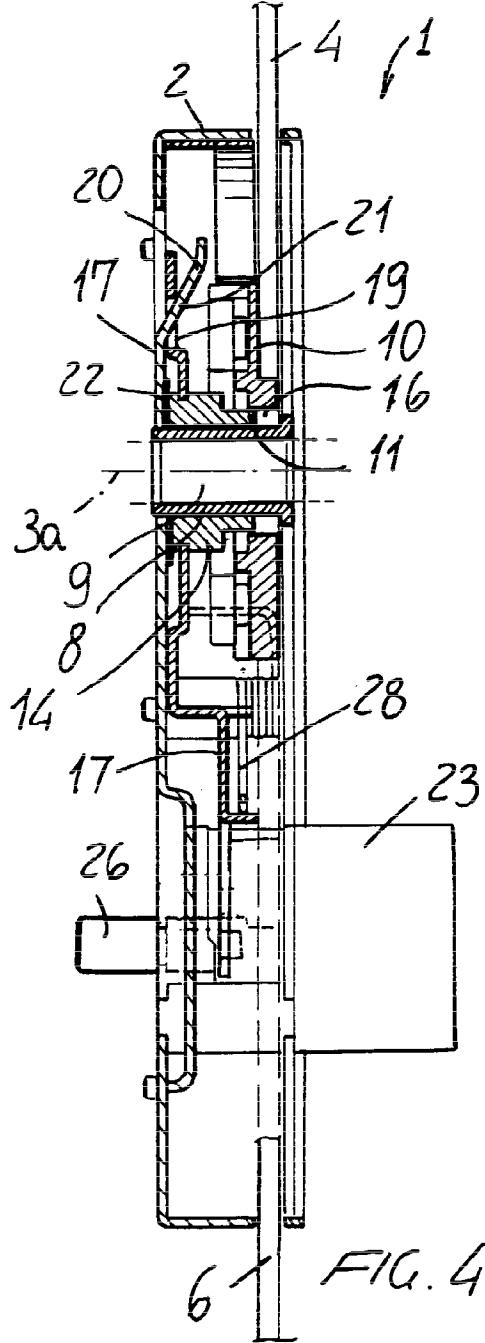


FIG. 1









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EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0012

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	US-A-4 676 083 (SEDLEY BRUCE S ET AL) 30 June 1987	1-6,8	E05B13/00 E05C9/06
A	* column 2, line 64 - column 6, line 51; figures *	7	
X	GB-A-394 172 (W.NEWMAN & SONS LTD) * page 1, line 70 - page 2, line 72; figures *	1-4,6-8	
X	US-A-1 505 865 (COSTA) * page 1, line 93 - page 4, line 14; figures *	1-4,6,8 7	
X	DE-A-41 23 937 (WEBER FRIEDRICH) 21 January 1993 * column 2, line 7 - column 3, line 53; figures *	1,2,6,8, 9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E05B E05C
<p>The present search report has been drawn up for all claims</p>			
Place of search THE HAGUE	Date of completion of the search 26 April 1996	Examiner Henkes, R	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			